IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Applicant:	Ward D. Parkinson et al.	Art Unit:	2827
Serial No.:	10/634,153	Examiner:	Viet Q. Nguyen
Filed:	August 4, 2003		
For:	Analog Phase Change Memory	Atty Docket:	ITO.0553US P16341

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REPLY BRIEF

This Reply Brief addresses the new arguments set forth by the Examiner in the Examiner's Answer.

In the Examiner's Answer, the Examiner makes the point that any phase change memory necessarily stores information in terms of one or more resistance values set in the phase change memory material. Thus, in some memories, only two levels are provided and these levels may be represented either by 0 or 1. The 0 and 1 digital levels correspond to either more conductive or less conductive phase change memory material because the material is either crystalline or amorphous. In multilevel phase change memory, multiple states may be stored as different resistance values. But in every phase change memory, what is being stored is a digital specification of an input value, such as 0 or 1, and what is output is a digital specification, such as 0 or 1. Every semiconductor memory is either conductive or not and that conductivity is

normally controlled by either a voltage or a resistance. If the Examiner's construction were to rule, then every phase change memory would be an analog memory and every phase change memory would be an analog phase change memory. This would be odd since no one ever calls phase change memories analog phase change memories and the use of analog would seem to be redundant. Instead, phase change memories are considered digital memories because they have digital inputs and they provide digital outputs.

The problem with the Examiner's construction is that it is inconsistent with the usage in the field and the definitions in the specification, as well as the usage in the dependent claims.

The present specification defines an analog memory at page 1, lines 18 *et. seq.* as "capable of storing the magnitude as an analog value instead of as a digitized value." As pointed out in the Appeal Brief, the Applicant's definition is not inconsistent with any usage in the art. This must be so because generally phase change memories are not called analog phase change memories and, by calling phase change memory an analog phase change memory, something distinct must be meant by the word "analog" or else it would merely be redundant. Moreover, the Applicant cited another patent which uses the terms in the same way. Namely, the cited patent 5,745,409, inadvertently omitted from the appendix and attached hereto, talks about having a memory which is selectively either digital or analog. A memory is digital or analog because it stores information in either a digitized format or an undigitized format. When storing in an undigitized format, there are analog inputs and analog outputs.

Thus, the sum total of the evidence of what one of ordinary skill in the art would have understood the term to mean, and the usage in the present specification, all substantiate the claimed construction that an analog memory is one that stores an analog value as a magnitude and not as a digitized value.

M.P.E.P. § 2111.01 at page 2100-49, states that the ordinary and customary meaning of a term may be evidenced by a variety of sources, including the claims themselves. Thus, it is permissible to use not only the claim being interpreted, but, also, the dependent claims, to demonstrate that the Examiner's construction is not viable.

A problem with the Examiner's construction is illustrated by claim 2. Claim 2 calls for selectively enabling either digital or analog information to be stored. Under the Examiner's construction, if digital or analog information is provided to the memory, digitized, and then stored, it stores analog information. The problem is how does one store digital information then and be what the Examiner would call a digital phase change memory? The claim requires

selective digital and analog information storage and yet, under the Examiner's reading and construction, claim 2 becomes incomprehensible. If I provide digital information, and store digital information, then I have a digital memory. If I provide analog information, convert it to digital, store the digital information, then I have an analog memory? The memory operates exactly in the same way and stores exactly the same information. How can one be called a digital memory and the other be called an analog memory? It is respectfully submitted that the construction as applied, for example, to claim 2, demonstrates the defects in the Examiner's construction.

This can also be seen in claim 12 that calls for selectively enabling either digital or analog data to be stored in the memory. If digitized data is stored in the memory, how can it be said that analog data is stored in the memory? The same goes for claim 16. Claim 17 calls for an analog read sense amplifier, a digital read sense amplifier, an analog write circuit, and a digital write circuit. None of these elements can be found in any of the cited references. They have only one sense amplifier and one write circuit because they do not read and write selectively digital or analog data.

Claim 21 more explicitly calls for writing analog data for storage. In other words, an analog memory is not claimed, but what is claimed is a memory that writes the analog data for storage. Thus, it must be the analog data that is stored, not digitized versions of it.

The Examiner concedes that all of the cited references store digitized values. For example, the Examiner contends that because any phase change memory can store digital information or analog information that has been digitized, it can be called an analog memory. But this is inconsistent with the usage in the specification because an analog memory is defined as one that does not store digitized information and is inconsistent with the cited reference which also gives evidence of how one of ordinary skill in the art would understand the term. For all these reasons, references that store digitized values are of no significance and this excludes all of the cited references. Certainly, every prior art phase change memory stores digitized values and since phase change memories are not typically referred to as analog phase change memories, such a construction would reduce the term "analog" to being merely redundant and have no meaning. In effect then, it reads "analog" right out of the claim and simply then reads the claim on a conventional phase change memory.

Arguments with respect to multilevel memories are unavailing. Multilevel memories are digital memories because they take different states and digitize them into one of more than two

levels. Those levels are then run out as digital values. No magnitude of any analog signal is ever stored. Instead, digitized states are stored.

For all these reasons, it is contended that the rejection is untenable and should be reversed, not only with respect to the independent claims, but also with respect to the dependent claims as set forth above.

Respectfully submitted,

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